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(54) MEDICAL APPLICATOR

(71) We, ORTHO PHARMACEUTICAL CORPORATION, a Corporation of the State of New Jersey, United States of America, of Raritan, State of New Jersey, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to medical applicators and in particular to syringe-type medical applicators.

For many medical reasons it is necessary or desirable to apply various medicaments to body cavities. In order to provide a simple method of applying the medicament with a minimum of unpleasantness, the medicaments are often applied with a syringe-type applicator. Most often the patient purchases the syringe prefilled with the medicament which has been prescribed at the desired dosage level.

Conventional applicators of this type have a plastic body portion, one end of which constitutes a medicament reservoir and the other end of which is tapered to relatively small diameter and constitutes an ejector tip. A plunger, the leading end of which is of only slightly smaller diameter than the medicament reservoir, is telescopically mounted within the reservoir, thus sealing one end of the applicator. The end of the ejector tip is breakably sealed. When the time has come to apply the medicament, the user breaks the seal at the end of the ejector tip, inserts the ejector tip into the body cavity to which the medicament is to be applied, and presses the plunger to force the medicament out from the open end of the ejector tip.

The above described syringe-type applicators have a number of inherent deficiencies. Firstly, such a syringe is not easily adaptable to more than one use since once the ejector tip seal is broken and a portion of the medicament applied, no means is provided to reseal the partially emptied syringe for storage until the medicament is again needed. This may result in a waste of expensive medicament, and, if makeshift sealing is attempted, may result in inadvertent ejection of the medicament during storage. Too much pressure on the plunger during transportation or storage prior to initial use may cause the ejector tip seal to break prematurely, thus resulting in unsaleable goods, in the case of the distributor and retailer, or wasted medicament and a messy condition in the case of the user.

Secondly, these conventional syringe-type applicators consisting of the plunger, medicament reservoir, and ejector tip consecutively arranged, are of substantial length and thus not adaptable to efficient and compact packaging or storage. Furtherwore, these applicators are not readily adaptable to being carried in a discreet manner by the patient for use outside of the home.

Thirdly, a major portion of the ejector tip is exposed during transportation and storage and between uses, thus raising the possibility of gross contamination which may be introduced into the patient.

Accordingly the present invention provides an applicator which comprises a hollow elongated body portion open at both ends having an integrally joined first section and second section, the first section being of relatively uniform cross-section constituting a medicament reservoir and the second section constituting an ejector nozzle, a piston slidably disposed within the open end of the medicament reservoir thus closing the reservoir, said piston being at its point of largest cross-sectional dimension of substantially the same shape as and only slightly smaller than the inside of the medicament reservoir, a hollow plunger having inner cross-sectional dimensions which are greater than the outer cross-sectional dimensions of the ejector nozzle and outer cross-sectional dimensions which are smaller than the inner cross-sectional dimensions of the medicament reservoir, said plunger having one open end and one closed end and being telescopically mounted over the ejector

nozzle, the closed end of the plunger having a centrally located inward projection provided with fastening means which are in engagement with complementary fastening means provided on the inner surface of the ejector nozzle, the said projection acting as a plug for the ejector nozzle, the outward facing end of the piston and the open end of the plunger being adapted so that the plunger may engage the end of the piston when medicament is to be applied.

The construction of the applicator of the invention in which the plunger is initially telescopically mounted over the ejector nozzle, provides a syringe-type medicament applicator which is more compact and thus more readily stored and more discreetly carried than prior art applicators.

The projection within the plunger acting as a plug for the ejector nozzle and the complementary fastening means carried by the projection and the inner surface of the end of the ejector nozzle, prevents any messy or inconvenient seal breaking prior to application of the medicament. When the medicament is to be used the plunger is simply unfastened from the ejector nozzle to open the same and to allow the medicament to flow from the applicator when the plug is activated. The applicator of the present invention may thus be used for a plurality of measured doses since the end of the ejector nozzle may be sealed again by mounting the plunger over the ejector nozzle and engaging the fastening elements. The ejector nozzle, which is to be inserted into the body cavity, is thus protected from gross contamination by bacteria during storage. In addition, since the ejector nozzle fastening elements are located on the inner surface of the same, the outer surface of the nozzle remains smooth and thus non-abrasive.

The body portion of the applicator may be made of any suitable material and may conveniently be made of a plastics material.

The body portion, the hollow plunger, and the plug at its point of largest cross sectional dimension, are generally of circular cross section. The ejector nozzle of the body portion generally has a diameter less than the diameter of the medicament reservoir, and the plunger usually has an inner diameter only slightly greater than the outer diameter of the ejector tip and an outer diameter only slightly less than the inner diameter of the medicament reservoir.

The plug may be made from any suitable nontoxic material, for example rubber or a plastics material. The outward facing end of the plug and the open end of the plunger may be engaged by any suitable fastening means. For example the outward facing end of the plug may have a portion of diameter slightly smaller than the inner diameter of the plunger so that the plunger and plug may be engaged by positioning the open end of the plunger over the outward facing end of the plug.

The fastening elements on the inner surface of the marginal end portion of the ejector nozzle and the complementary fastening elements on the outer surface of the inward projection of the plunger preferably comprise intermeshing threads integrally moulded in the respective components, but any complementary fastening means which may be easily engaged and disengaged may be utilized.

The first section and second section of the body portion are usually integrally connected by a central section, and the plug is generally of a shape which is the same as that of the inner surface of the central section and the immediately adjacent inner surfaces of the ejector nozzle and the medicament reservoir respectively.

The applicator may be used to dispense medicaments such as vaginal creams.

The present invention will now be more particularly described by way of example and with reference to the accompanying drawings in which:—

Figure 1 is a view in perspective of an applicator of this invention;

Figure 2 is a cross section of the applicator illustrated in Figure 1 taken along lines 2—2;

Figure 3 illustrates in cross section the applicator of Figures 1 and 2 when the same is ready for use;

Figure 4 illustrates in cross section this same applicator in use.

Referring now to Figures 1 and 2, the applicator 1 comprises an elongated body portion 2 of circular cross section which is open at both ends. The elongated body portion 2 consists of a first section 3 and a second section 4 integrally joined by a central section 15. The first section 3 constitutes a medicament reservoir which is filled with medicament 5. The second section of the body portion 4 constitutes the ejector nozzle through which the medicament is applied. The ejector nozzle 4 is of substantially smaller diameter than the medicament reservoir 3. The body portion of the applicator is made of a moulded plastics by techniques well-known in the art.

The applicator 1 also comprises a rubber piston 6 having a maximum diameter which is slightly smaller than the inner diameter of the medicament reservoir 3. The rubber piston 6 is slidably disposed in the open end of the medicament reservoir 3 thus acting to seal the same.

The applicator 1 also comprises a hollow moulded plastic plunger 7 having open end 8 and closed end 9. The plunger 7 has an inner diameter greater than the outer diameter of the ejector nozzle and an outer

diameter less than the inner diameter of the medicament reservoir 3. The compactness of the applicator is maximized by making the inner diameter of the plunger 7 only slightly greater than the outer diameter of the ejector nozzle 4 and the outer diameter of the plunger 7 only slightly less than the inner diameter of the medicament reservoir 3. The plunger 7 is telescopically mounted over the ejector nozzle 4 and the ejector nozzle and the plunger are of substantially the same length.

The inner surface 17 of the end portion of the ejector nozzle 7 contains a series of threads 10 integrally moulded therein. The closed end 9 of the plunger contains an inward projection 11 having a diameter only slightly less than the inner diameter of the end portion of the ejector nozzle and having a series of threads 12 integrally moulded in the outer surface thereof. These threads 12 carried by the projection 11 are engaged with the threads 10 carried by the ejector nozzle 4. The projection 11 acts as a plug for the ejector nozzle 4 thus preventing medicament from passing outward from the same.

The outward facing end of the piston 6 has a portion 13 having a diameter only slightly smaller than the inner diameter of the plunger 7. Thus the plunger 7 when it is disengaged from its telescopic mounting over the ejector nozzle 4 may be inserted over and engaged with the end 13 of the piston 6 as shown in Figure 3.

Referring now to Figures 3 and 4 when it is desired to apply the medicament, the plunger 7 is unscrewed from its position over the ejector nozzle 4 and is inserted over the end 13 of the piston, 6 so that the plunger is in effective position to activate the piston 6 and force the medicament 5 outward from the ejector nozzle 4.

The piston 6 has a shape which is essentially the same as that of the inner surface of the central section 15, and the adjacent inner surfaces 14 and 16 of the ejector nozzle 4 and medicament reservoir 3 respectively. Thus, when the plunger is fully depressed as shown in Figure 4, a maximum amount of the medicament is ejected from the applicator.

The invention is not limited to the details of the applicator specifically described above. For example the piston 6 could be made from a plastics material. The body portion of the applicator is not necessarily of circular cross section and furthermore the ejector nozzle of the body portion need not necessarily be straight but could be curved or shaped.

WHAT WE CLAIM IS:—

1. An applicator which comprises a hollow elongated body portion open at both ends having an integrally joined first section and second section, the first section being of relatively uniform cross-section constituting a medicament reservoir and the second section constituting an ejector nozzle, a piston slidably disposed within the open end of the medicament reservoir thus closing the reservoir, said piston being at its point of largest cross-sectional dimension of substantially the same shape as and only slightly smaller than the inside of the medicament reservoir, a hollow plunger having inner cross-sectional dimensions which are greater than the outer cross-sectional dimensions of the ejector nozzle and outer cross-sectional dimensions which are smaller than the inner cross-sectional dimensions of the medicament reservoir, said plunger having one open end and one closed end and being telescopically mounted over the ejector nozzle, the closed end of the plunger having a centrally located inward projection provided with fastening means which are in engagement with complementary fastening means provided on the inner surface of the ejector nozzle, the said projection acting as a plug for the ejector nozzle, the outward facing end of the piston and the open end of the plunger being adapted so that the plunger may engage the end of the piston when medicament is to be applied.

2. An applicator as claimed in claim 1 in which the fastening means on the inner surface of the end portion of the ejector nozzle and the fastening means on the outer surface of the inward projection of the plunger comprise intermeshing threads integrally moulded into the end portion of the ejector nozzle and the inward projection of the plunger respectively.

3. An applicator as claimed in claim 1 or claim 2 wherein the outward facing end of the piston has a portion having a diameter slightly smaller than the inner diameter of the plunger so that the plunger and the piston may be engaged by positioning the open end of the plunger over the outward facing end of the piston.

4. An applicator as claimed in any one of the preceding claims wherein the elongated body portion comprises a central section integrally connecting the first section with the second section and in which the piston has a shape which is essentially the same as that of the inner surface of the central section of the elongated body portion and the immediately adjacent inner surface of the ejector nozzle and the medicament reservoir respectively.

5. An applicator substantially as hereinbefore described with reference to and as illustrated in Figures 1 to 4 of the accompanying drawings.

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1248636 COMPLETE SPECIFICATION

1 SHEET This drawing is a reproduction of the Original on a reduced scale

Fig. 1.

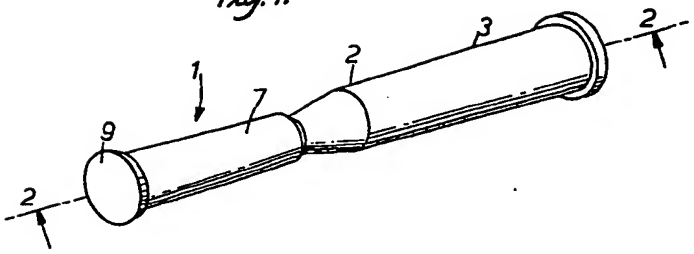

Fig. 2.

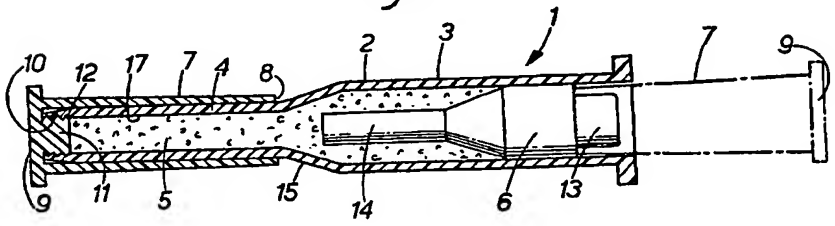

Fig. 3.

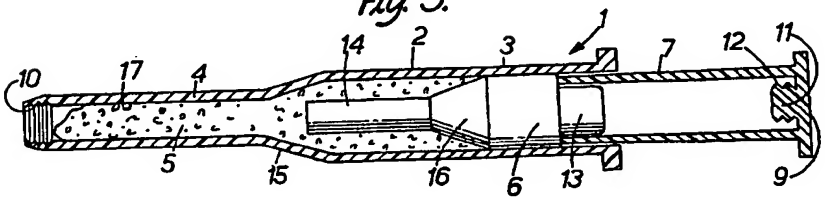

Fig. 4.